in water-alcohol having a titer of 55-61°GL, insoluble in water-alcohol having a titer of 48-61°GL and are insoluble in alcohol, (3) have anti-Xa titer to USP titer of at least 6, (4) which mucopolysaccharides comprise, (5) glucosamine units which are sulfated in the primary position, (6) one N-acetyl glucosamine unit for two 2-O-sulfate iduronic acid units and for two N-sulfate-glucosamine units, and the pharmaceutically acceptable salts thereof.

83. The mucopolysaccharides of claim 82, the NMR spectrum of which exhibits glucosamine units the primary carbons in the 6-position being free of hydroxyl group and the spectrum exhibits resonance signals in the region corresponding to chemical displacements in the 100 ppm region (as shown by stars in Fig. 14).

84. The mucopolysaccharides of claim 83, wherein the spectrum exhibits another resonance signal in the 75 ppm region.

85. The mucopolysaccharides of claim 84, which spectrum exhibits resonance signals in the 4.8 and 5.2 ppm regions, which signals are weaker than that in the 5.4 region.

86. The mucopolysaccharides of claim 83, wherein the spectrum exhibits a supplementary signal in the 60 ppm region adjoining the G_2 designated signal (as shown in Fig. 14).

87. The mucopolysaccharides of claim 82, which is shown by one of the NMR spectra of Figs. 11, 12, 14 or 15.

88. The mucopolysaccharides of claim 83, which has a USP titer of about 45, an anti-Xa factor titer of about 160 units per mg and a ratio of anti-Xa titer to USP titer of about 3.55.

89. The mucopolysaccharides of claim 88, wherein the USP titer is less than about 10.

90. The mucopolysaccharides of claim 83, wherein the ratio of anti-Xa titer to USP titer is at least 3.

91. The mucopolysaccharides of claim 90, wherein the ratio of anti-Xa titer to USP titer is at least 10.

92. The mucopolysaccharides of claim 91, wherein the ratio of anti-Xa titer to USP titer is at least 50.

93. The mucopolysaccharides of claim 92, wherein the ratio of anti-Xa titer to USP titer is at least 130.

94. The mucopolysaccharides of claim 90, wherein the anti-Xa titer is not less than about 50 units per mg.

95. The mucopolysaccharides of claim 94, wherein the anti-Xa titer is at least 300 units per mg.

96. The mucopolysaccharides of claim 95, wherein the anti-Xa titer is at least 900 units per mg.

97. The mucopolysaccharides of claims 82, 88, 89, 90 and 94, wherein the molecular weights are in the range of about 4,000 to about 8,000 daltons.

98. The mucopolysaccharides of claim 82, wherein the USP titer does not exceed about 13, the anti-Xa titer is in the range of about 135 to about 160 units per mg, the ratio of anti-Xa to USP units is in the range of 13 to 16 and the molecular range is from about 4,000 to about 8,000 daltons.

99. The mucopolysaccharides of claim 82, wherein the USP titer does not exceed about 6, the anti-Xa titer is not less than about 44, the ratio of anti-Xa to USP titers is over about 9 and the molecular weight is in the range of about 4,000 to 8,000 daltons.

100. The mucopolysaccharides of claim 82, wherein the salts are selected from the group consisting of sodium and calcium.

101. The mucopolysaccharides of claim 86, which is selectively fixable on antithrombin III.

102. A therapeutic composition of mucopolysaccharide fragments, which composition has (1) improved antithrombotic activity in vivo and selective inhibition of the Xa-factor (measured in terms of anti-Xa activity) higher than that of heparin, and (2) a lower anticoagulation activity than heparin (measured in USP units), (3) an anti-Xa titer higher than 100 units per mg, (4) a ratio of anti-Xa to USP titers of at least

6, which therapeutic composition comprises a therapeutically acceptable carrier, and in an antithrombotic effective amount, a mucopolysaccharide of claims 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 or 101.

103. The therapeutic composition of claim 102, which is a solution of the mucopolysaccharides in a concentration of about 1,000 to 100,000 Yin-Wessler units per ml.

104. A therapeutic method for controlling thrombosis in a patient which comprises administering to the patient in a therapeutically antithrombotic effective amount, the composition of claims 102 or 103 and controlling thrombosis by inhibiting coagulation factor Xa.

105. The therapeutic method of claim 104 wherein the administration of the composition is by injection or infusion.

106. A process for obtaining mucopolysaccharide fragments of heparin which have improved antithrombotic activity in vivo and selective inhibition of the Xa-factor (measured in terms of anti-Xa activity) higher than that of heparin and a lower anticoagulation activity than heparin (measured in USP units), which mucopolysaccharides have a molecular weight in the range of about 2,000 to 8,000 daltons, a ratio of anti-Xa to USP titers of at least 6, which process comprises mixing heparin fragments having a molecular weight in the range of about 2,000 to 50,000 daltons in an aqueous-alcoholic medium, separating the liquid which contains the fragments in solution, and precipitating out the soluble